

REMARKS

The forgoing amendment amends Claim 1 to clarify the claimed invention. Claims 1-41 are currently pending in this application. For the reasons set forth below, Applicant believes that the rejections should be withdrawn and that Claims 1-41 are in condition for allowance.

REJECTION OF CLAIMS 1-10 UNDER 35 U.S.C. 102(b)

The Examiner rejected Claims 1-10 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 4,975,821 to Lethellier (“Lethellier”). In order to anticipate a claim under 35 U.S.C. 102(b), a reference must disclose each and every element of a claim. As discussed below, this rejection is respectfully traversed.

Claim 1

Claim 1 requires a first return circuit being connected to the first series circuit and including a second switch and a snubber capacitor that are connected in series, to return energy accumulated in the saturable reactor, *wherein the saturable reactor operates in a saturation region when the second switch is ON.* (*emphasis added*).

In rejecting Claim 1, the Examiner alleged that the switch SW2 and the parallel inductance of the primary L_p of Lethellier (Fig. 2) correspond to the second switch and saturable reactor recited by the claim. According to one embodiment of the invention, as illustrated in Figure 5, when the second switch Q2 is ON stored energy of the saturable reactor SL1 is discharged and a capacitor C3 is charged in a first stage, followed by the discharge of capacitor C3 to reset the magnetic flux of the saturable reactor SL1 in a second stage, and then the *saturable reactor SL1 operates in the saturation region Hs:Bf-Bg* in a third stage. (*emphasis added*). (See e.g., [0074]-[0081]; Figs. 5, 9 and 10).

The claimed configuration of the elements results in an operation that differs from the operation of the circuit described by Lethellier. Lethellier does not disclose a saturable reactor operating in a saturation region when the second switch is ON, as required by Claim 1. Lethellier discloses that when switch SW2 is turned ON the voltage on the primary of

transformer T₁ remains connected to capacitor C2 after the inductive current reverses, and the capacitor C2 then discharges into the transformer T₁. (See Fig. 2; Column 3, ll. 50-54). Lethellier does not describe a parallel inductance L_p being operated in a saturation region when the second switch SW2 is ON. Accordingly, Claim 1 is not anticipated by Lethellier.

A comparison of Figure 2 of Lethellier to Figure 5 of the present invention clearly illustrates that Lethellier does not disclose or suggest the second switch and saturable reactor as claimed. Lethellier fails to describe a saturable reactor that operates in a saturation region when the second switch is ON, as required by Claim 1. Accordingly, Claim 1 is not anticipated by Lethellier.

Claims 2-10

Claims 2-10 depend from Claim 1. Accordingly, for at least the same reasons discussed above, Claims 2-10 are patentable over Lethellier.

REJECTION OF CLAIMS 11-41 UNDER 35 U.S.C. 103(a)

The Examiner rejected Claims 11-41 under 35 U.S.C. 103(a) as being unpatentable over Lethellier in combination with Applicant's prior art Figure 1 ("PA 1") and U.S. Patent No. 5,570,278 to Cross ("Cross") and further in combination with U.S. Patent No. 6,278,621 to Xia et al. ("Xia"). The Examiner has not established a prima facie case of obviousness. As discussed below, this rejection is respectfully traversed.

Claims 11-41

Claims 11-41 depend from Claim 1. As discussed in more detail above, Lethellier does not describe saturable reactor that operates in a saturation region when the second switch is ON as required by Claim 1. PA 1, Cross and Xia do not describe this feature either. Accordingly, for at least the same reasons discussed above with regard to Lethellier, all the features or elements of Claims 11-41 are not obvious in view of Lethellier in combination with PA 1 and Cross, and further in combination with Xia. Thus, Claims 11-41 are patentable over Lethellier in combination with PA 1 and Cross, and further in combination with Xia.

Claim 21

Additionally, with respect to Claim 21 the cited references neither teach nor render obvious all features or elements of the claim. Neither Lethellier, PA1, Cross nor Xia teach or suggest a DC converter further comprising at least one tertiary winding wound around a core of the transformer and loosely coupled with the primary winding of the transformer, and each of the tertiary windings provided with the rectifying/smoothing circuit having the rectifying element and the smoothing element, as recited by Claim 21.

In one embodiment of the invention illustrated in Figure 14, a first end of the tertiary winding 5c is connected to an anode of the diode D2, and a cathode of the diode D2 and a second end of the tertiary winding 5c are connected to the capacitor C2, wherein the diode D2 and capacitor C2 form a rectifying/smoothing circuit. A comparison of Figure 2 of Lethellier, PA 1, Figure 1 of Cross and Figure 3A of Xia to Figure 14 of the present invention clearly illustrates that neither Lethellier, PA1, Cross nor Xia disclose or suggest a tertiary winding provided with the rectifying/smoothing circuit having the rectifying element and smoothing element, as claimed. Accordingly, Claim 21 is patentable over Lethellier in combination with PA 1 and Cross, and further in combination with Xia.

Claim 28

With respect to Claim 28 the cited references neither teach nor render obvious all the features or elements of the claim. Neither Lethellier, PA1, Cross nor Xia teach or suggest a DC converter including a rectifying/smoothing circuit that further comprises a fourth reactor connected between the smoothing element and the secondary winding of the transformer, a third switch connected in parallel with the rectifying element and having a control terminal connected to a second end of the secondary winding, and a fourth switch connected in parallel with a series circuit of the third switch and secondary winding and having a control terminal connected to a first end of the secondary winding, and a second rectifying element connected in parallel with the secondary winding of the transformer through the third switch, as recited by Claim 28.

In one embodiment of the invention claimed by Claim 28, which is illustrated in Figure 36, a fourth reactor L1 is connected between the smoothing element C4 and the secondary winding 5b of the transformer T, a third switch Q3 is connected in parallel with the rectifying element D1 and has a control circuit connected to a second end of the secondary winding 5B, and a fourth switch Q4 is connected in parallel with a series circuit of the third switch Q3 and secondary winding 5b and has a control terminal connected to a first end of the secondary winding 5b, and a second rectifying element D82 connected in parallel with the secondary winding 5B through the third switch Q3. Neither Lethellier, PA1, Cross nor Xia disclose or suggest a rectifying/smoothing circuit comprising a fourth reactor, a third switch, a fourth switch, and a second rectifying element, as claimed. Accordingly, Claim 28 is patentable over Lethellier in combination with PA 1 and Cross, and in further combination with Xia.

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CONCLUSION

The foregoing is submitted as a complete response to the Office Action identified above. Applicant believes that this application is now in condition for allowance and solicits a notice to that effect. If there are any issues that can be addressed via telephone, the Examiner is asked to contact the undersigned at 404.685.6799. The Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account 11-0855.

Respectfully submitted,

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